

REMARKS

By this Amendment, Figs. 1 and 2A-2C are amended; the specification is amended; and claims 1, 4, and 5 are amended. Reconsideration and prompt allowance of the claims are respectfully requested based upon the preceding amendments and the following remarks.

Figs. 1 and 2A-2C are amended to include reference characters 116 and 118 to the supply channels connecting first and second supply chambers 100, 102, respectively, to reaction chamber 112. The figures are further amended to add reference character 120 to identify the exhaust channel connecting the reaction chamber 112 and the exhaust chamber 114. In addition, reference character 122 is added to the figures to identify the connecting channel conducting the first fluid to the delay part 110. Accordingly, the specification is amended to at least include the annotations added to the figures as indicated above. No new matter is presented in this amendment.

Claims 1-16 stand rejected under 35 U.S.C. 102(b) as being anticipated by Kellogg (US 2001/0001060). A rejection based on 35 U.S.C. §102 requires every element of the claim to be included in the reference, either directly or inherently. Applicants respectfully submit that this rejection is traversed by the amendments indicated above and the following arguments.

Claim 1 is amended to more clearly recite capillary stop valves that utilize fluid from side connecting channels to control fluid flowing to/from a reaction chamber. As disclosed, fluid from side connecting channels acts to remove the stop pressure of the capillary stop valves. Kellogg, on the other hand, appears to only disclose, in paragraph [0082], wherein “capillary junctions and microvalves of the invention are based on the use of rotationally-induced fluid pressure to overcome capillary forces.” (Emphasis added).

Indeed, in the last paragraph on page 3 of the Office Action, the PTO agrees that Kellogg uses centripetal force to control the flow of fluids. Notwithstanding the assertion of the Examiner that Kellogg also uses surface tension to move the fluid, Applicants respectfully submit that

amended claim 1 recites wherein the fluid moves “using only surface tension. . . .” (Emphasis added). Therefore, Applicants’ fluid controlling device is distinguished from Kellogg in that while Kellogg may use surface tension in addition to centripetal force to cause fluid to flow, the device recited in claim 1 uses only surface tension to control the flow and exchange of fluids.

Applicants further submit that centripetal force is (i) active actuation that requires external actuation, while surface tension is passive actuation that requires no external actuation, and (ii) in the case of passive actuation, there is an advantage in that external control, e.g., rotation, is not needed in order to attain the same fluid control action. Accordingly, the benefits provided by the Applicants’ surface tension only device further distinguish Applicants’ device from Kellogg.

Furthermore, regarding the Examiner’s assertion, at the top of page four of the Office Action, that “surface tension is inherent in capillary micro channels,” Applicants respectfully submit that while surface tension may be inherent in capillary micro channels, a device designed to utilize/overcome these forces is not inherent.

Applicants respectfully submit that claim 1 is further distinguished from Kellogg. For example, claim 1 recites:

“at least one side connecting channel connecting the first capillary stop valve to the second stop valve, wherein the capillary stop valves stop the flow of the fluid in each supply channel and exhaust channel using the surface tension of the fluid, and wherein a flow of fluid through the side connecting channel opens the capillary stop valves. . . .”

Kellogg, in Figs. 5 and 6A-6K, appears on the other hand to only disclose a single channel between chambers and nowhere does Kellogg disclose valves 314, 309 being connected via side-connecting channels.

Claim 1 further recites:

“at least one flow delay part formed within said side connecting channel and delays flow of the fluid by the surface tension of the fluid.” (Emphasis added).

The Office Action asserts that valve 114, disclosed by Kellogg in paragraph [0113], suggest the Applicants' flow delay part. Applicants respectfully disagree. Applicants' delay part, formed within the side connecting channel, operates to delay passage of the first fluid in the side connecting passage, thereby delaying removal of surface tension at a capillary stop valve. Kellogg's valve 114, on the other hand, is placed in channel 305 to control fluid movement from the first fluid chamber 303 to the second fluid chamber 307. Applicants respectfully submit that valve 314 is not formed within a side channel, and indeed, valve 114 is not a delay device as used in the context of the instant application, operating, as best as can be understood, based upon centripetal force.

Accordingly, because Kellogg does not disclose, teach or suggest each and every limitation recited in amended claim 1, the rejection of claim 1 under 35 U.S.C. §102(b) is improper. Applicants respectfully submit, therefore, that independent claim 1 is patentable over Kellogg.

Claims 2-17 depend from independent claim 1 and are likewise patentable over Kellogg at least for their dependence on claim 1, as well as for additional features they recite. Withdrawal of the rejection over Kellogg is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-17 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
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